Contribution ID: **23133** Type: **Paper**

A Reverse Approach to Determine Research Reactor Configuration Based on National Demand Assessment

Tuesday, 14 November 2023 14:30 (20 minutes)

This paper reviews recent experiences conducted worldwide tackling underutilization challenges faced by research reactors. A nuclear power program with ambitious goals, requires a well-established nuclear infrastructure and robust national framework. And to achieve that in a sustainable manner, countries aim to develop well-utilized research reactors. This paper explores case studies from different counties and sheds special light on the backwards flow approach to determine functional specifications, technical specifications (i.e. reactor core size, geometry, neutron flux, irradiation positions, fuel type, required irradiation duration) based on the captured national needs and aspirations through a set of analyses. Additionally, utilization requirements are presented using the mentioned approach considering three main applications which are radioisotopes production, neutron transmutation doping, and material testing.

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Session Classification: Day 2 Parallel Session - I : Research Reactors

Track Classification: Research Reactors